The "Digital Navy Atmosphere"

How a "Focused" AI is Digitally Evolving Product Lifecycle Management

PLM Road Map™ & PDT North America 2026

AI in PLM: A Disruptive Opportunity and Challenge

Turning AI disruption into enterprise value:
Strategic insights for the PLM professional

6-7 May 2026

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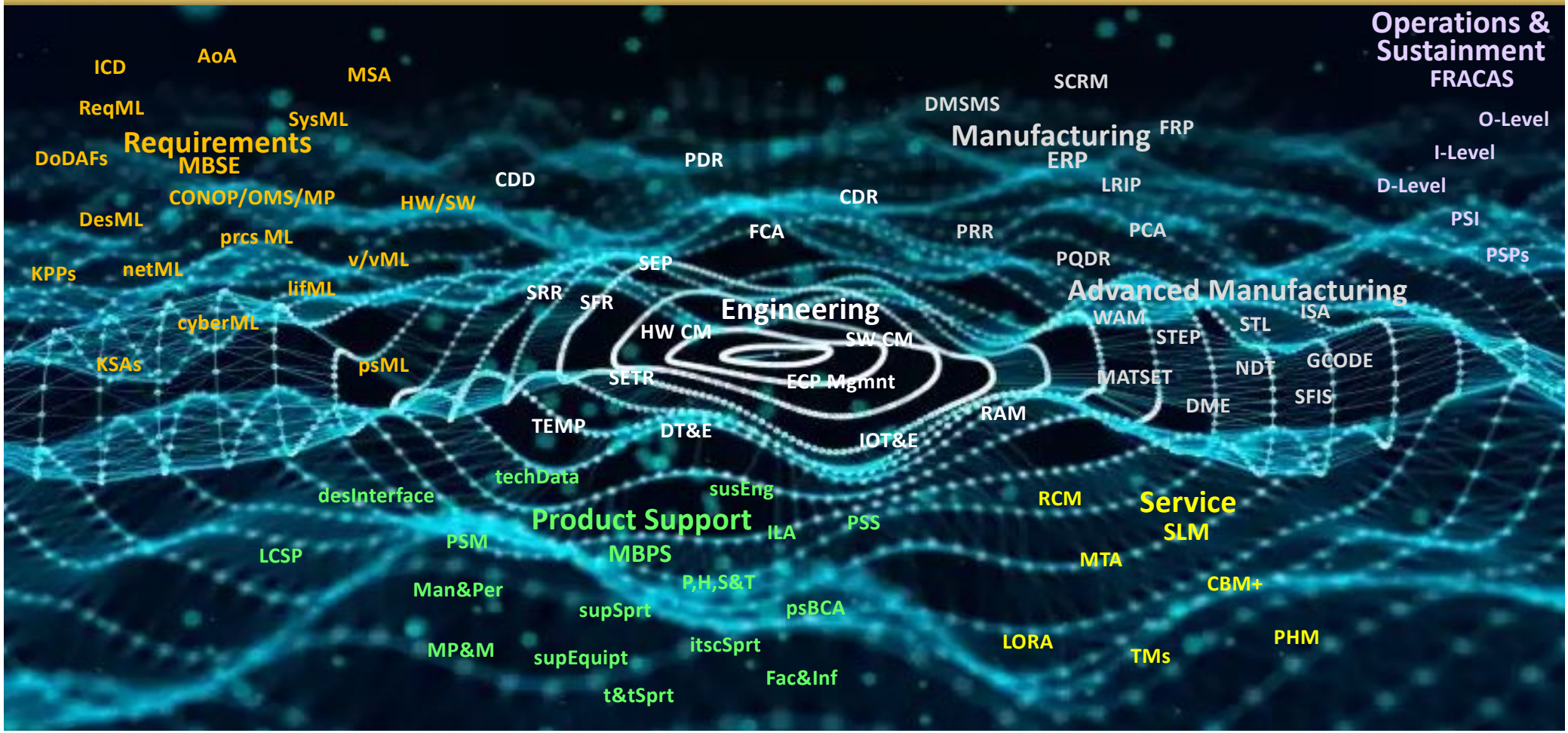
The Industrial Base Cloud Hosting Environment (IB CHE)

The IB CHE is a strategic approach across the process and technology continuum

The IB CHE:

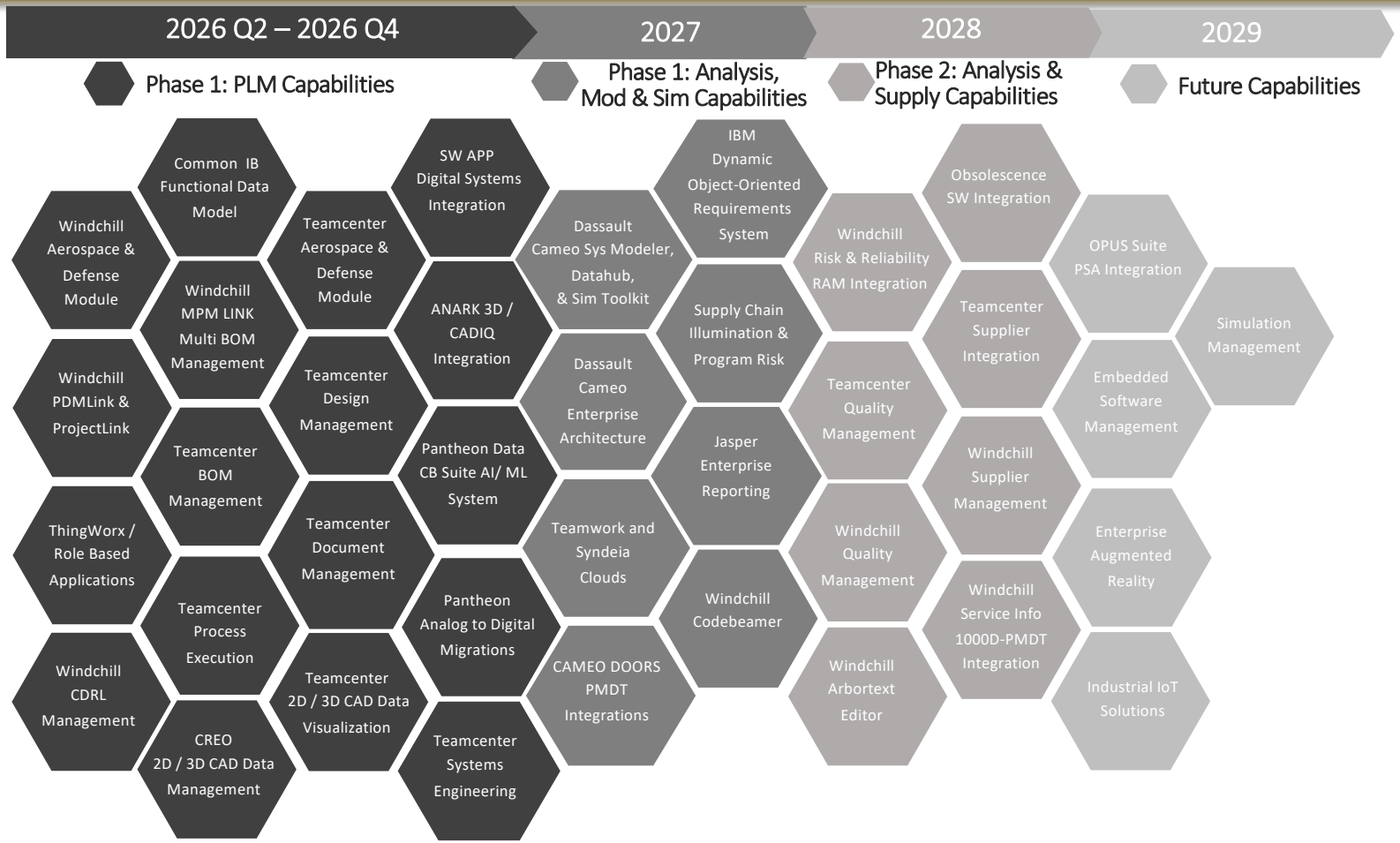
- **IS** a collaboration between the Submarine Industrial Base (SIB) Direct Reporting Program Office (DRPM), Program Executive Office Integrated Warfare Systems (PEO IWS), PEO Unmanned & Weapons (PEO U&W), and Naval Sea Systems Command and the partnerships are growing rapidly.
- **IS** on an aggressive construction schedule: Completed two major Cyber Certifications in 11 months
- **IS** a set of leading-edge commercial technologies that will be utilized as out of the box solutions which maintains low cost to build, operate and sustain, modernize and innovate- **NO CUSTOMIZING**
- Grounded in Engineering and Logistic data standards: SAE EIA 649, MILSTD 31000C, ASME Y14, SAE GEIA-STD-0007, etc.
- **IS** enabled with both **Unclassified and Classified** capabilities
- **Spans** crosscutting technologies with significant implications and applications for Naval Warfare and its Industrial Base, including Additive Manufacturing (AM) or 3-Dimensional Printing, Subtractive Manufacturing (i.e. Computer Numerical Control, CNC); Artificial Intelligence/Machine Learning (AI/ML) that supports Robotics and Automation, Advanced Machining, advanced analysis, modeling and simulation, **from requirements throughout acquisition, manufacturing, operations, supply, maintenance, repair and overhaul, sensing, measurement, and digitalization and connectivity**
- **Utilizes** AI/ML capabilities to transition the Navy from **"Analog to Digital"** to power the mission impact of our workforce.

Excuse the Acronyms but…
a lot of data is created in the PLM of a Product
Data that is Structured, Semi-Structured & Unstructured



IB CHE: Seeding the Cloud with Technical Capabilities

A deliberate strategic approach across the process and technology continuum



IB CHE: the "Digital Navy Atmosphere (DNA)"

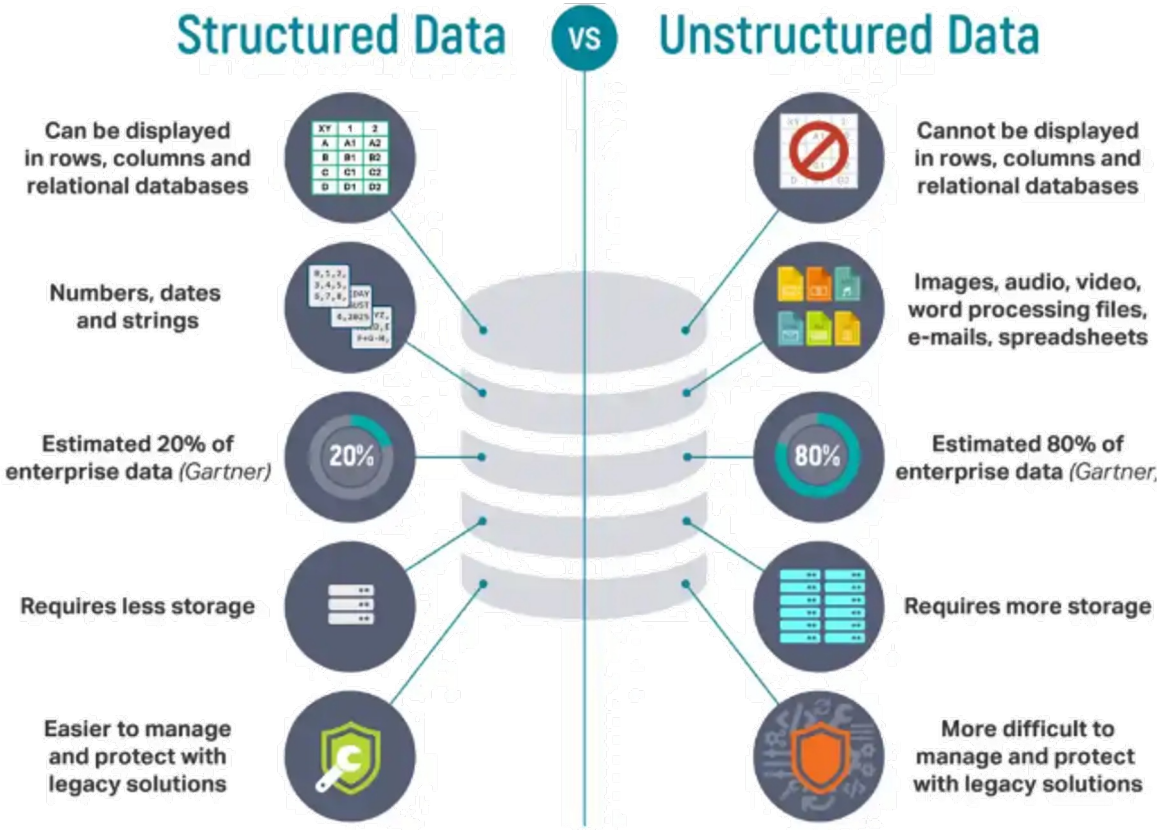
Just as human DNA is the blueprint of life, the IB CHE's DNA is the product's digital blueprint, empowering the workforce with access to that Digital Twin and Thread information and "Tools" needed to perform their jobs effectively in a digital-first environment.

Data Standards are essential for developing "AI" Ready Data

Optimizes AI performance, efficiency, and reliability by ensuring consistency, quality, and interoperability across systems enabling significant advantages across the organization

Today's technologies pretty much require structured data which is often developed from data standards set across the design, engineering, manufacturing, and product support spectrum through Mil Specs, Standards, and Policies.

PLM helps by establishing data and workflow standards ensuring that all data follows a consistent format, structure, and meaning, delivering significant advantages across an organization. Reduces the need for intensive data preprocessing for AI.



While PLM can store unstructured data, utilizing it presents significant challenges as if often contains hundreds of nonstandard fields, some of which may be sensitive or complex. This complicates use across other integrated applications

A Day in the Life of a Digitally Evolved Team

Establishing Data Standards for 3-Dimensional Computer Aided Design (CAD)

Notional

The digital twin refers to digital models of configuration assets that include design specifications and engineering models describing its geometry, materials, components, behavior, and operational data.

Structured Data is key to CAD across the IB CHE:

- **Improves Accuracy and Consistency**
- **Supports Large Language Model (LLM) Integration**
- **Enhances Data-Driven Decision Making**
- **Improves Scalability and Cost Efficiency**

Data standards applied across:

Manufacturing BOM (mBOM)

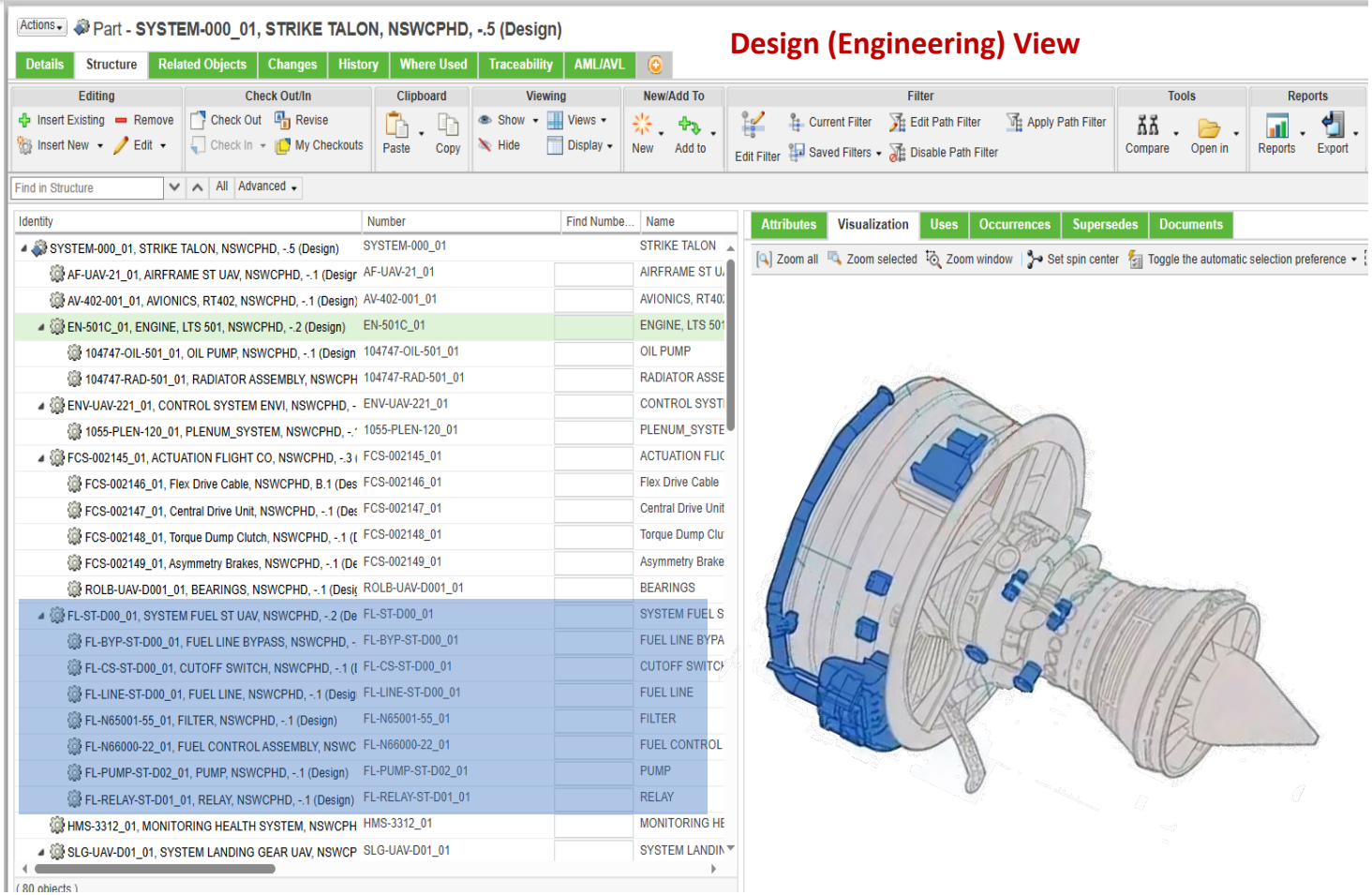
Service BOM (sBOM)

Provisioning BOM (pBOM)

Associated Information:

- ***Contractor Data Requirements***
- ***Product Support Analysis***
- ***Test and Evaluation***
- ***All other pertinent data to the system***

Design (Engineering) View



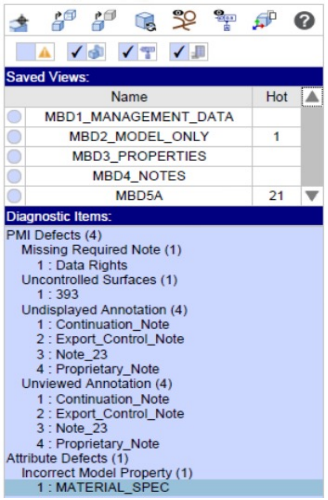
A Day in the Life of a Digitally Evolved Team

Capabilities that Validate / Verify Data Standard Compliance across PLM for Optimizing the IB CHE and AI enabling the workforce to move to digital first operations

CAD COMPLIANCE CHECKING

Identify missing or non-conforming file attributes

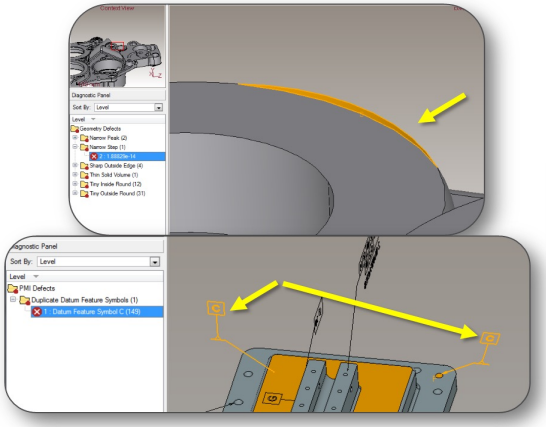
- Compliance with Standards
- early detection and correction of defects prior to PMDT load or release
- ensures adherence to compliance requirements
- minimizes manual checking



MODEL QUALITY CHECKING

Identify defects impacting downstream usage of the 3D CAD model

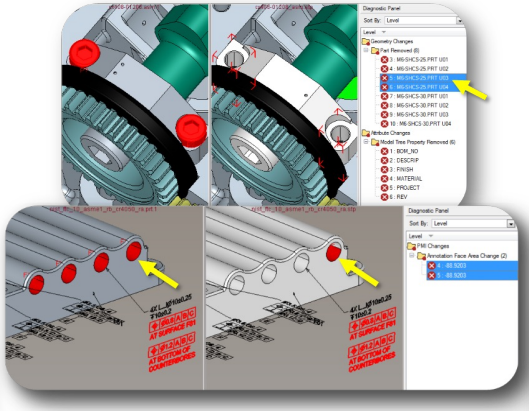
- Early detection and correction of defects prior to model release
- Reduces model publishing failures
- Eliminates downstream model rework
- Reduces risk of model divergence resulting from downstream model rework



DERIVATIVE VALIDATION

Identify model derivatives with incomplete or imprecise data

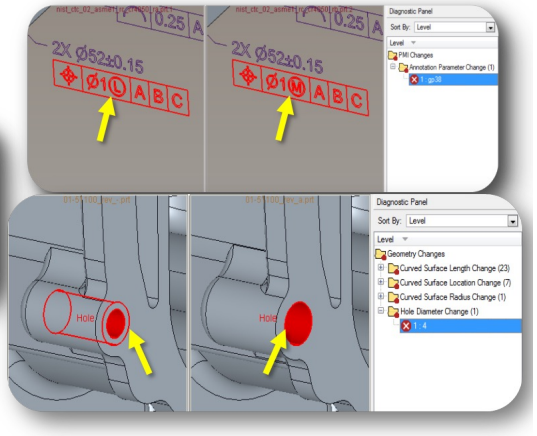
- Detection and correction of defects prior to model release
- Assist the reviewer and author in correcting issues
- Eliminates model divergence from down stream rework



REVISION COMPARISON

Document changes & prevent inadvertent changes when approving ECOs

- Minimizes ECO's to fix errors from previous ECO's
- Minimize time to comprehensively document changes
- Minimizes time to understand the change
- Minimizes ECO check cycles



A Day in the Life of a Digitally Evolved Team

Moving from an Analog to Digital World to equip the workforce with cutting edge technology and better integrate data and analytic tools to support decision-making."

Notional

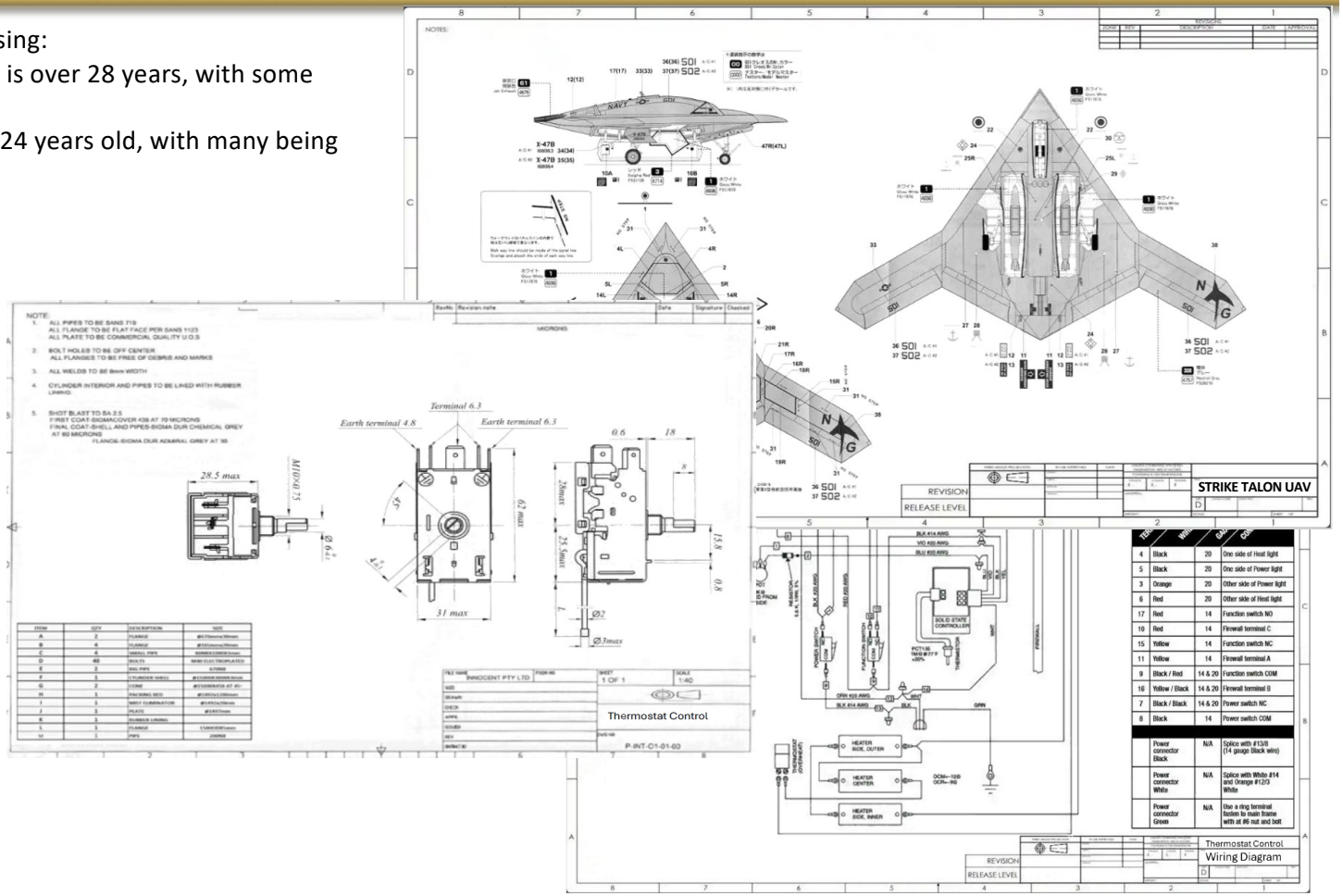
The average age of US weapon systems is increasing:

- In the US Air Force, the average age of aircraft is over 28 years, with some fleets exceeding 50 or even 60 years old.
- US Navy ships and submarines average about 24 years old, with many being significantly older.

95% of DOW Systems are of 2D technical data, and we continually buy traditional 2D Technical Data Packages (TDPs), in support of acquisition, MRO and sustainment efforts. These TDPs often consist of 2-dimensional engineering drawings, along with associated documents like specifications, lists, and quality assurance requirements.

To enable PLM and AI, digitizing 2D technical data such as engineering drawings, schematics, parts lists and other CDRL data offers significant advantages in accuracy, efficiency, and integration compared to paper or analog formats:

- Improved accuracy and consistency
- Faster access, retrieval, and preservation
- Improved configuration and change management
- Enhanced integration with digital applications for supporting for advanced analysis

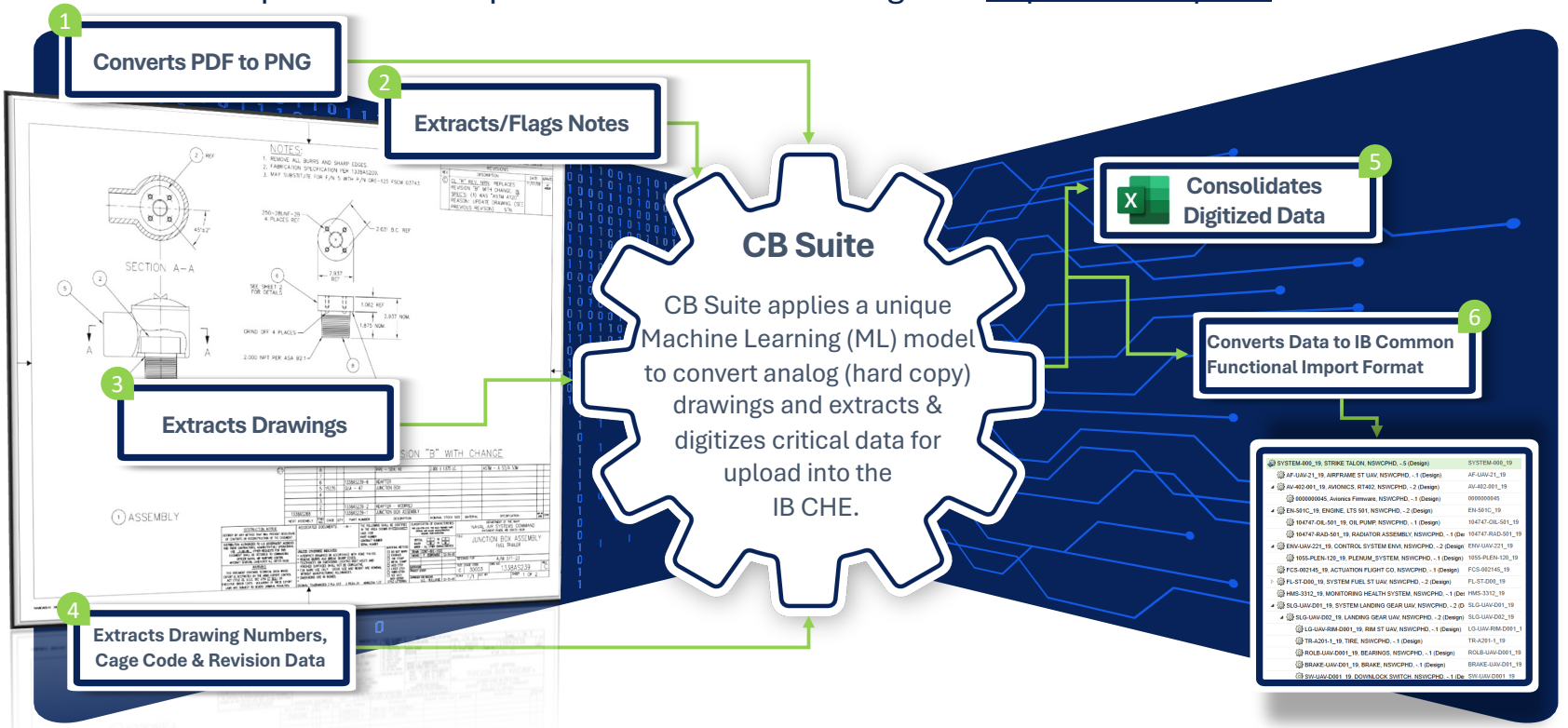


A Day in the Life of a Digitally Evolved Team

Utilizing AI to transition from "Analog to a Digital" iteratively improving AI performance over time

Applying Common Data Standards for AI/ML to Aggregate, Organize, Process & Digitize Complex Data.

- AI/ML "Learns" patterns and adapts to deliver actionable insights at unparalleled speed.



1. CB Suite **converts drawings** delivered in PDF format to PNG format.
2. CB Suite **extracts notes & flags notes data** from drawings that have notes.
3. CB Suite **extracts drawings.**
4. CB Suite **extracts data such as Drawings Number, Cage Code, and Revision Data.**
5. CB Suite **consolidates data** into **semi-structured CSV** (Excel).
6. CB Suite **converts semi-structured data to a Common IB Functional Data model import compatible format.**

A Day in the Life of a Digitally Evolved Team

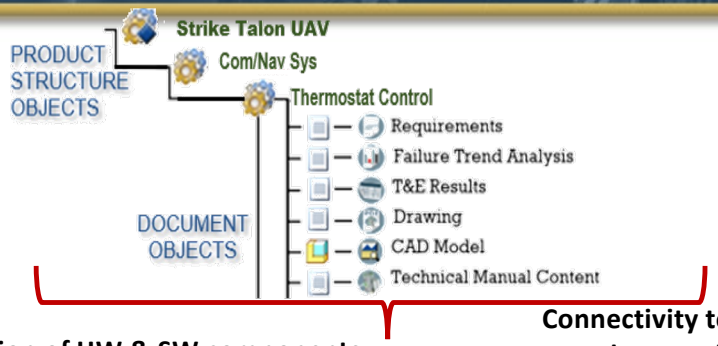
Model Based Design creates a digital backbone that connects system requirements, architecture, and design across the entire product lifecycle

Notional

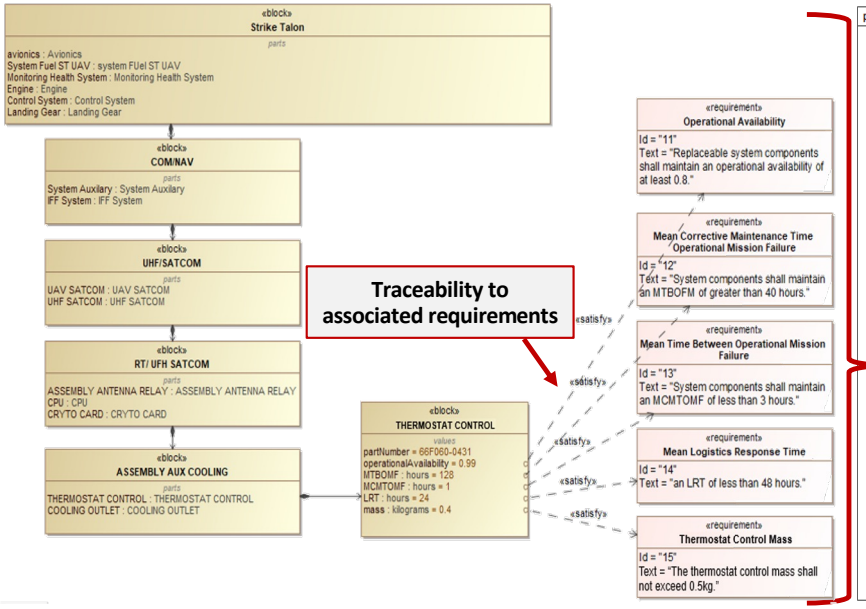
Integration of Model Based Design (MBD) (MBSE + MBPS) with PLM enables digital capabilities across the full spectrum of lifecycle from system design across engineering and product support disciplines.

The PLM solution is the largest collection of truth information for system design, and provides a useful, API-accessible endpoints for digital tools and repositories to synchronize data.

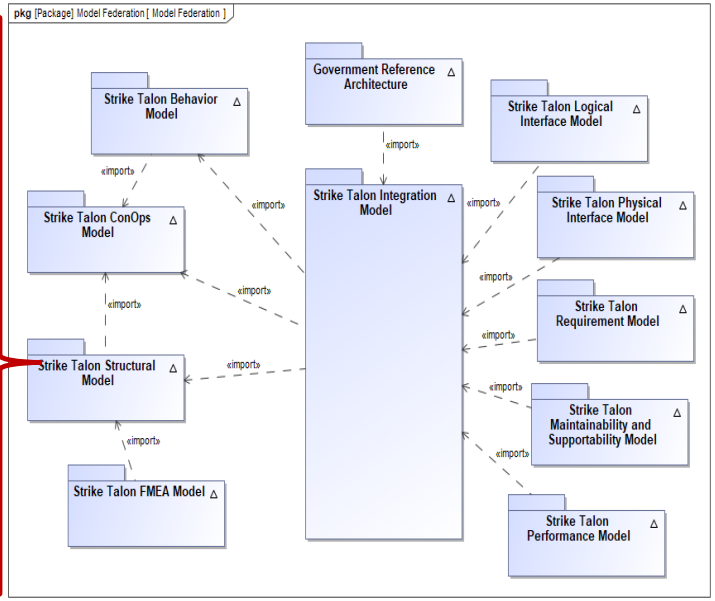
The MBD / PLM integration provides configuration control of both model and structure ensuring engineers and product support teams are working off the same sheet of music.



SysML representation of HW & SW components



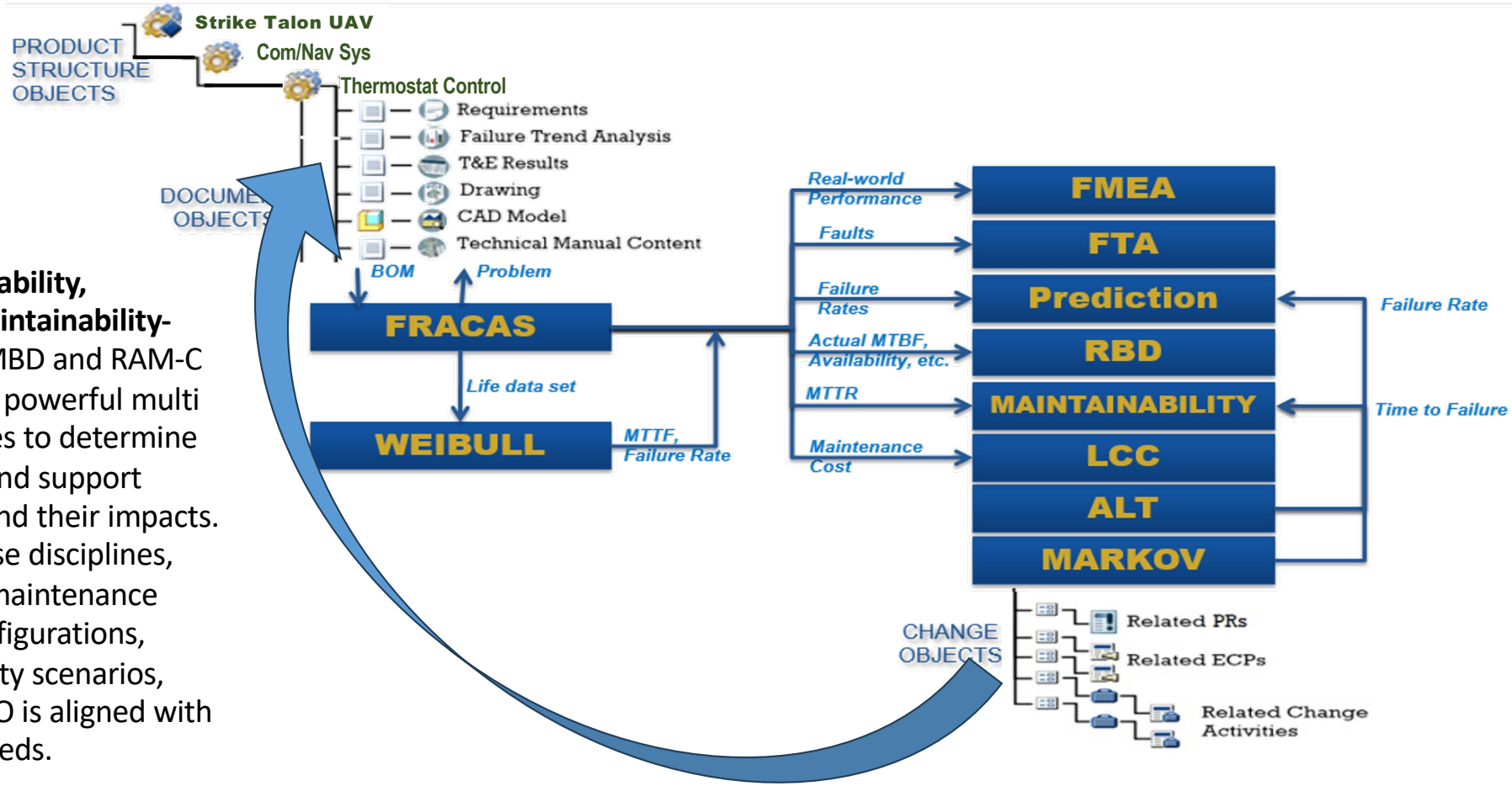
Connectivity to larger model base, with traceability up to operational and enterprise-scale impacts



A Day in the Life of a Digitally Evolved Team

RAM-C Analysis, Modeling & Simulation with PLM optimizes system availability, reduces ownership costs, and prevent failures from the design phase through to retirement.

Integrating Reliability, Availability, Maintainability-Cost (RAM-C) MBD and RAM-C Analysis deliver powerful multi spectral analyses to determine critical design and support modifications and their impacts. By bridging these disciplines, PLM can track maintenance data across configurations, model availability scenarios, and ensure MRO is aligned with supply chain needs.

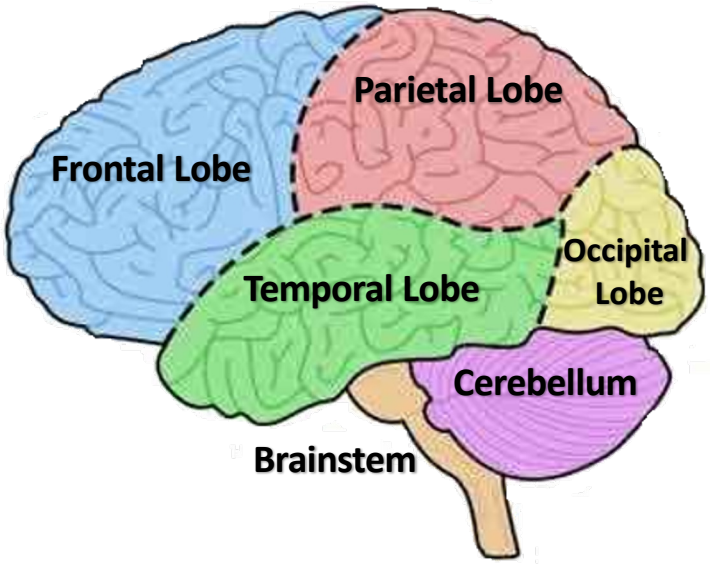


Decision versus Inference

Knowing this distinction is key to effective AI Utilization

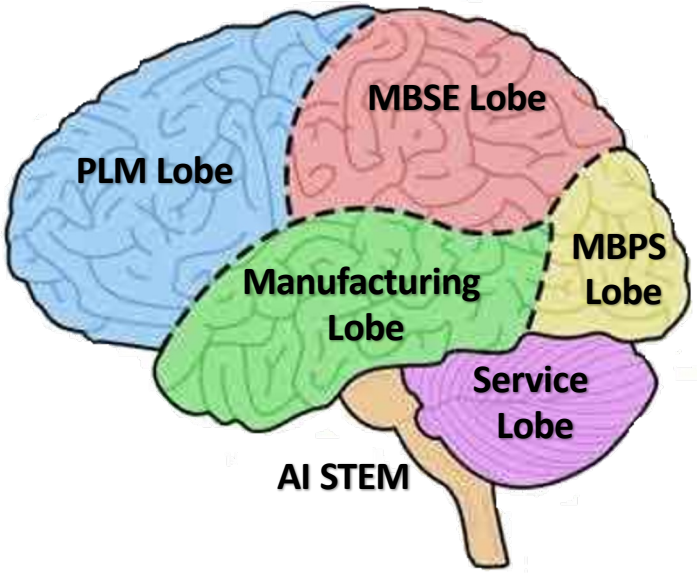
The Human Brain:

In response to query all lobes of the brain “fire” to develop cognition, relevance, intuition create a **Decision**



The AI Brain:

In response to query AI reaches into all lobes using data, analysis, and statistical modeling to create an **Inference**



"Good judgment comes from experience, and experience comes from bad judgment". - Mark Twain

A Day in the Life of a Digitally Evolved Team

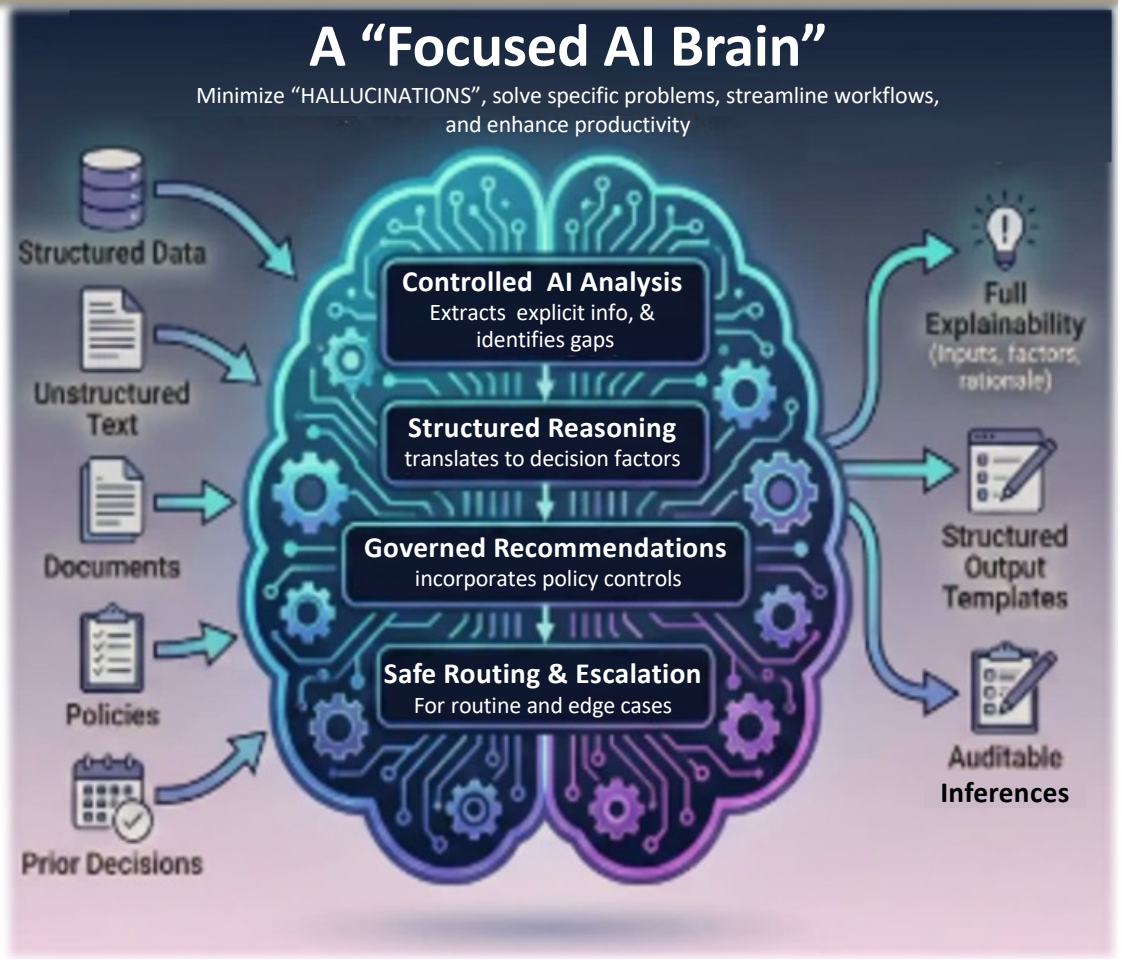
A "Focused" Semantic Agentic AI enables autonomous decision-making and context-aware insights

"Focused" Semantic Agentic AI versus a Data Lake

A Data Lake is a centralized repository that primarily stores historical snapshots of data, structured and unstructured at any scale.

Semantic agentic AI represents a significant evolution from passive data storage utilizing autonomous software agents that use Large Language Models (LLMs) and a "semantic layer" to understand, reason, and act on data.

- **Overcoming the "Data Swamp"**: A common challenge with data lakes is that they can become "data swamps"—disorganized repositories where it is difficult and time-consuming to find valuable information.
- **Reduced Engineering Effort**: Instead of manual heavy Extract, Transform, Load (ETL) processes to make data usable, AI agents can directly process and act on data, significantly lowering engineering overhead.
- **Autonomous Operation & Action**: While Data Lakes simply store data for analysis, Semantic Agentic AI can independently reason, plan, and execute tasks. It can automatically act, such as reordering supplies, adjusting, or updating, rather than just waiting for a human to query the data.
- **Enhanced Data Accessibility**: Agentic AI with semantic layers allows for querying data across silos consolidating all data. (e.g., interacting with NMMES, Supply Chain, ERP data)
- **Contextual Understanding**: Semantic layers allow agents to understand business meaning, relationships, and the context of data, reducing the need for manual, complex SQL queries.



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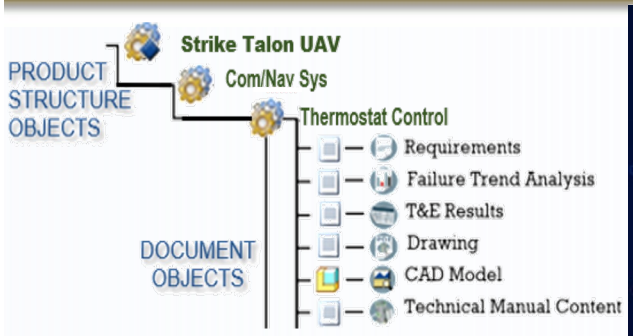
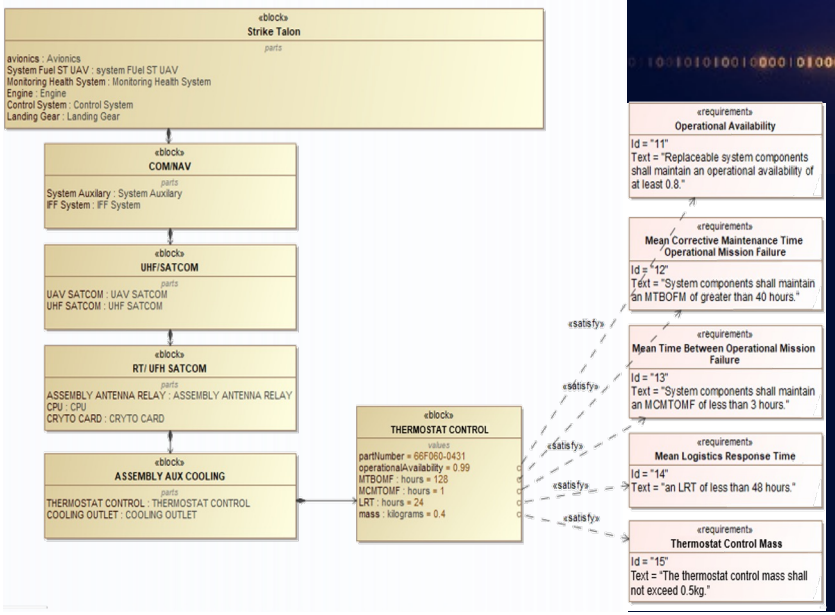
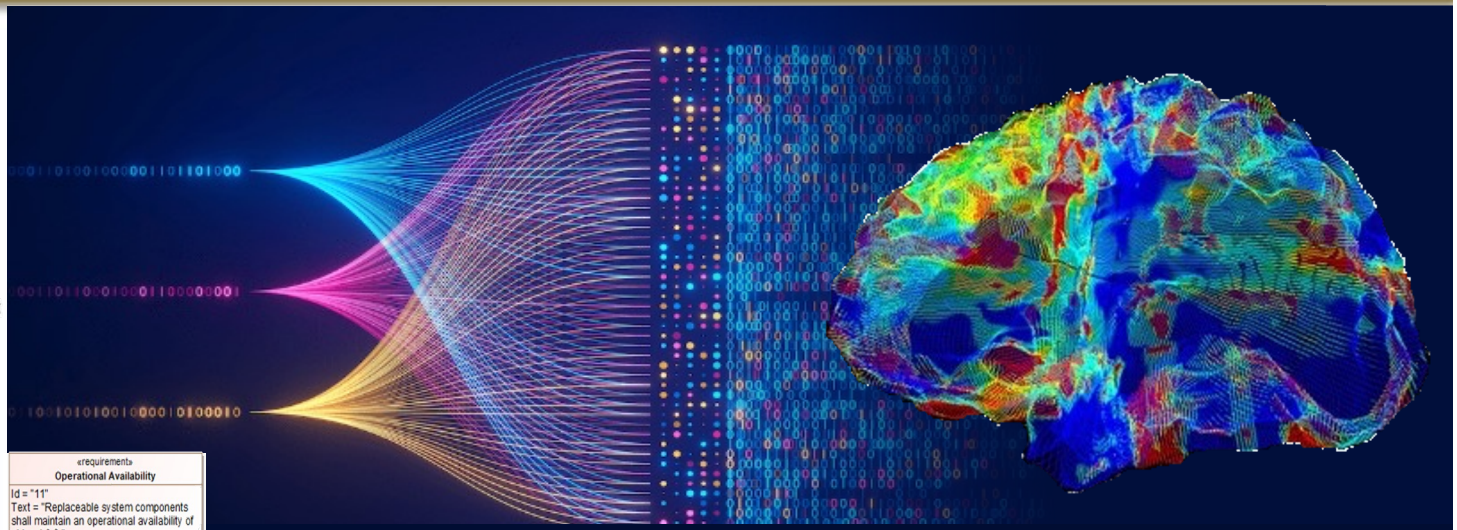
A“ Focused” Semantic Agentic AI enables autonomous decision-making and context-aware insights





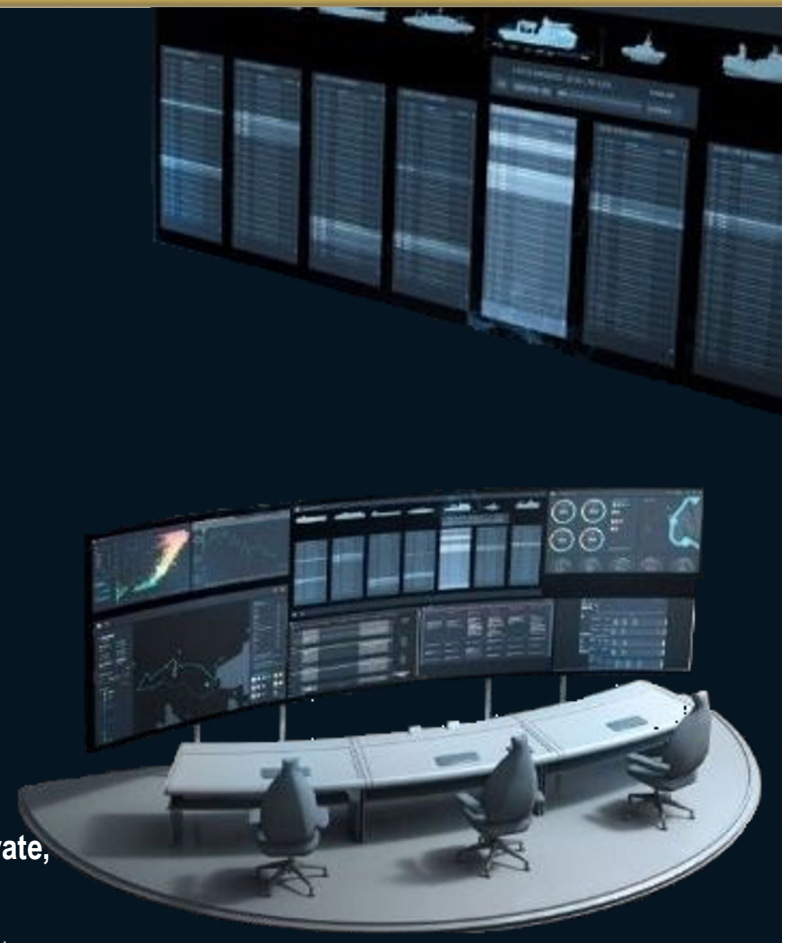


A “Focused” Semantic Agentic AI can enable:

- Context-Aware Decisions: By using a semantic layer, these agents understand the meaning of data rather than just processing raw numbers.
- Reduced Hallucinations: Grounding AI agents in governed, structured semantic models ensures that actions and insights are accurate, trustworthy, and consistent across departments.
- Autonomous Workflows: Unlike GenAI, which requires constant prompting, agentic AI acts independently to complete multi-step workflows (e.g., detecting a ECP activities, Ship MRO, supply chain risks, analyzing alternatives, and Industrial base optimization.

A Day in the Life of a Digitally Evolved Team

A "Focused" Semantic Agentic AI evolves the IB CHE into an active, intelligent "system of action" and decision-making



Rapidly evolving threats, changing warfighting concepts, and technologies require us to innovate, engineer, and integrate quickly to maintain "Overwhelming Relevance".

Evolving to Digital First Operations means Leaving the Vestiges of the Past